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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P33456WOPWC	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/GB 03/03236	International filing date (day/month/year) 17.07.2003	Priority date (day/month/year) 19.07.2002	
International Patent Classification (IPC) or national classification and IPC C08B37/00			
Applicant THE UNIVERSITY OF LIVERPOOL			
<p>1. This report is the International preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 22.01.2004		Date of completion of this report 03.11.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Contet, F Telephone No. +49 89 2399-8671	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB 03/03236

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-48 as originally filed

Claims, Numbers

1-22 as originally filed

Drawings, Sheets

1/7-7/7 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
 - ☐ not complied with for the following reasons:
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. claims 1-22, first invention .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-22
Inventive step (IS)	Yes: Claims	
	No: Claims	1-22
Industrial applicability (IA)	Yes: Claims	1-22
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV

Lack of unity of invention

The subject-matter of independent claim 1 is already known (see the grounds for this objection in Item V). The requisite unity of invention (Rule 13.1 PCT) therefore no longer exists inasmuch as a technical relationship involving one or more of the same or corresponding special technical features in the sense of Rule 13.2 PCT does not exist between the subject-matter of the following groups of inventions claimed as alternatives in present claim 1.

The application relates to a plurality of inventions, or groups of inventions, in the sense of Rule 13.1 PCT. They have been divided as follow:

- 1) A method for the production of a library of heparan sulfate derivatives, said method comprising a chemical modification step specially characterised in that the step is selected from the steps A or B.
- 2) A method for the production of a library of heparan sulfate derivatives; said method comprising a chemical modification step, specially characterised in that the step is selected from the steps C or D.
- 3) A method for the production of a library of heparan sulfate derivatives comprising a chemical modification step, specially characterised in that the step is selected from the steps E or G.
- 4) A method for the production of a library of heparan sulfate derivatives comprising a chemical modification step, specially characterised in that the step is selected from the steps F or H.
- 5) A method for the production of a library of heparan sulfate derivatives comprising a chemical modification step, specially characterised in that the step is selected from the steps I or J.
- 6) A method for the production of a library of heparan sulfate derivatives comprising a chemical modification steps, specially characterised in that the step is selected from the steps K to O.
- 7) An indefinite number of possible methods for the production of libraries of heparan sulfate derivatives comprising a combination of chemical modification

steps, specially characterised in that the steps are selected from the group A to O.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: DATABASE BIOSIS BIOSCIENCES INFORMATION SERVICE,
PHILADELPHIA, PA, US; WU ZHENGLIANG L & AL: "A NEW STRATEGY
FOR DEFINING CRITICAL FUNCTIONAL GROUPS ON HEPARAN
SULFATE" XP002268531

D2: US-A-6 127 347 (HOLME KEVIN R ET AL) 3 October 2000 (2000-10-03)

- 1- Claim 1 is directed to a method for preparing a library of heparan sulfate derivatives. D1 discloses the preparation of a heparan sulfate library by desulfating and resulfating heparin (steps A and/or B and E and/or G). D2 discloses the N-desulfation of heparin (steps A and/or B). The common inventive concept linking the various alternatives, i.e. "a method for the production of a library of heparan sulfate derivatives comprising at least one chemical modification step " is already known from the available prior art.
- 2- Article 17(3)(a) PCT stipulates that the ISA shall establish the International Search Report on those parts of the international application which relate to the invention first mentioned in the claims ('main invention') and for those parts which relate to inventions in respect of which the additional fees were paid. In the present case, the additional fees have not been paid and the ISR will relate to the first group of inventions mentioned in the previous Item IV.
- 3- **Novelty:**
In view of D1 and D2, the subject-matter of this first group is not new.
- 4- **Inventive step:**
Provided novelty could be established over D1 or D2, then the question will be raised which technical problem has been solved by the present application since a particular biological activity was not mentioned (see claim 16).
Thus an inventive step could not be established.

**INTERNATIONAL PRELIMINARY
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(SEPARATE SHEET)**

International application No.

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Re Item VIII

Certain observations on the international application

The expression "library" has no generally accepted definition. In this Report it is interpreted in the meaning of a "collection" (Article 6 PCT).